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Convergence of integrable operators affiliated to a finite von Neumann algebra

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Abstract

© 2016, Pleiades Publishing, Ltd.In the Banach space $L_1(M, \tau)$ of operators integrable with respect to a tracial state τ on a von Neumann algebra M, convergence is analyzed. A notion of dispersion of operators in $L_2(M, \tau)$ is introduced, and its main properties are established. A convergence criterion in $L_2(M, \tau)$ in terms of the dispersion is proposed. It is shown that the following conditions for $X \in L_1(M, \tau)$ are equivalent: (i) $\tau(X) = 0$, and (ii) $\|I + zX\|_1 \geq 1$ for all $z \in C$. A.R. Padmanabhan's result (1979) on a property of the norm of the space $L_1(M, \tau)$ is complemented. The convergence in $L_2(M, \tau)$ of the imaginary components of some bounded sequences of operators from M is established. Corollaries on the convergence of dispersions are obtained.

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